The Stroop Effect Investigation

The stroop effect is used to investigate ones processing and reaction speed, to be able to conduct this experiment a participant must read from a list of words for colours, but the words are printed in colour different to the word itself.

For example, the word ‘orange’ would be listed as text but printed in the color green, with the words written like this it plays games on the mind, so the participant may have trouble interoperating the color as they will automatically want to say the word displayed on the screen. With conducting this experiment we can assess an individual’s cognitive processing speed, their attentional capacity and their level of cognitive control.

Essentially to investigate the stroop effect by conducting an experiment to time how long it takes for participants to say the color of the words on two different lists (congruent/incongruent) to then produce evidence in the form of graphs and data analysis to support or disprove the following hypothesis.

Hypothesis

I predict that in trial one I will have a much quicker outcome than trial two, I think this because the brain will take longer to process and then interpret the color and words.

- IV – List of words congruent/incongruent
- DV – Time taken to name ink colors measured in seconds

As time is being measured, the experiment should be as controlled as possible. A field experiment will allow as many of the possible extraneous variables that may affect the DV to be controlled. If these variables are controlled it is more likely that any change in the DV is a result of the IV rather than other confounding variables.

Variables to be controlled:

- The room in which the experiment is to take place
- Time of day
- Lighting
- List size (number of color words)
- Font size/colours/backgrounds/row column size
- No other persons in the room to be present
- English as first language
- Background noise

Ethical Considerations

Consent - Informed consent will be obtained before conducting the experiment. Withdrawal - Participants will be told they may withdraw from the experiment at any time during/after the experiment. Data concerning the individual will be destroyed. Confidentiality - All participants’

details will be treated confidentially.

Materials

- List of colour words. One list contains 25 colour words that match the font colour (congruous) i.e. GREEN. The other list contains 25 colour words that do not match the font colour (incongruous) i.e. YELLOW. Both lists contain 25 words so data from each list time can be compared. Lists are standardized; same font, size, colour order.
- A copy of the words taken so the accuracy can be checked at all time of the experiment.
- Briefing and debriefing information is standardized and typed. This will make sure participants have all the information they need and nothing forgotten.
- Instructions
- A stopwatch
- Paper/pen to record results

Method

1. Participants were told to follow a link that took them to the tab where the Stroop effect experiment was conducted
2. Once on the link there will be a set of instructions outlining how to complete the experiment,
3. Once the participant has read over these and has given consent to continue, they must click the ‘run experiment’ button, then ‘go to first test’
4. You then will be presented with a chart with 25 words in it (as shown in figure 2.9), these words will all say a colour and the word will be the same colour as the word written
5. Proceed to read these words out as fast as you can out aloud, once you have read through all of the colours press the ‘finish’ button
6. It will present you will a number at the top of the screen, record this number down in a chart
7. Continue by pressing the ‘ok’ button and then the ‘continue experiment’.
8. You will then be presented with another set of 25 words in a chart (as shown in figure 2.10) however these words will not be the same colour as the word written
9. You will have to read out the colour presented, NOT written down. Once you have read each of the colours out aloud as fast as you can you press the ‘finish’ button
10. You will be presented with a time, record this time down
11. You will now have to repeat this process another two times, make sure you record your time every time.

Discussion

The results from this experiment illustrate that the reaction time for the congruent condition was significantly faster than that of the incongruent condition, as shown in the tables above. After the standard deviation for the ‘error’ was calculated, it can be seen that the incongruent condition had significantly higher error values in comparison to the congruent condition. This supports both the hypotheses and therefore proves the Stroop effect conducted in 1935, where participants were placed in two different conditions. The participants that were placed in two

different conditions. When the participants were assessed in the congruent condition were found to have a significantly lower reaction times when naming the color of the ink in comparison to when in the incongruent conditions.

The results of the presented experiment showed that using color neutral words did mean that participants could state the color ink the words were written in, in a faster time than they could for color associated words. Task completion times in trial 1 (color associated words) were shown to be statistically significantly different from those in trial 2 (colour neutral words). This suggests that the automatic process of reading the words interfered with the controlled process of naming the ink colour.

A similar result was found by J.R Stroop in 1935, in the original Stroop test. He used this result to state that there is substantial interference from the color name, causing people to find it hard to respond with the color ink in which the word is written rather than the color the word describes. Stroop's research also provided evidence for the concept that resources are limited, and have to be allocated accordingly. The present research goes to support this idea in the fact that the resources appear to have been allocated to the automatic process rather

than the controlled one. This suggests that in this case the limited processing resource have not been allocated to the required controlled processing function required to state the ink colour. Therefore supporting Stroop's ideas. It also provides support for Sciffrin and Schneider's two process theory.

The main problem encountered was the sample bias. The participants that were used were all around the same age in the same class, and cannot be generalized to society. Therefore the results gained are unreliable. The experiment can also be heavily criticized for being gender bias, as there was an uneven number of sexes. Another limitation was the effect of the uncontrolled variables had upon the investigation such as noise and light which acted as an interference and could have affected the reaction time and number of errors.

Improvements are required to increase the validity of the results. A larger sample size would make this experiment more reliable and more able to generalize the findings. To improve the aspect further, a wider age range would increase the validity as age could have an effect on attention. This could be used to research further into the mind of individuals. Furthermore, a more diverse gender would be beneficial in increasing the validity of the experiment as there are key differences between male and females as has been indicated throughout the field of psychology.

Conclusion

Stroop suggested that reading words is an automatic response. When a person is given a list of words they will read them, even if they have been asked not to. When presented with words and colours that do not match people will still try to read the word instead of naming the colour. Participants find it difficult to suppress the need to read words. This causes conflict and results in a slower response time.

The results of this experiment seem to support Stroop's theory and the hypothesis. The response times for incongruent lists vary widely. This may be because some participants were

less flexible in shifting from one task to another. All participants admitted to reading list one when they found that word and color matched. This caused great difficulty when word and color did not match. This would also support that theory that reading is an automatic response.

Reference List

1. Neuroscience For Kids 2015, viewed 12 August 2019, https://faculty.washington.edu/chudler/java/timestc.html
2. Cherry, K 2019, The Stroop Effect: Naming the Color but Not the Word, viewed 12 August 2019, https://www.verywellmind.com/what-is-the-stroop-effect-2795832
3. Farnsworth, B 2019, The Stroop Effect – How it Works and Why, viewed 12 August 2019, https://imotions.com/blog/the-stroop-effect/